

Irrigation Pit or Regulating Reservoir (No.)

Regulating Reservoir

Definition

A small storage reservoir constructed to regulate or store a supply of water for irrigation.

Scope

This standard applies to reservoirs created by impounding structures and pits excavated below the ground surface for the short-period storage of either diverted surface water, water from pumped or flowing wells, or water from an irrigation delivery system.

Regulating reservoirs created by earth embankments shall be within the scope of the standard for ponds (378).

This standard also applies to concrete and steel regulating reservoirs used to collect water from two or more small irrigation wells for application with a sprinkler or drip irrigation system.

This standard establishes the minimum acceptable quality level for the planning and functional design of irrigation regulating reservoirs. It does not include detailed design criteria or construction specifications for individual reservoirs or components of the regulating facility.

Purpose

To store water for relatively short periods to:

1. Provide for regulating fluctuating flows in streams or canals,
2. Provide suitable (usually larger) irrigation streams,
3. Provide for improved management of irrigation water,
4. Permit more efficient use of available labor,
5. Avoid nighttime operation, and

6. Provide storage for reuse irrigation systems.

Conditions where practice applies

This practice applies only to sites meeting all the following criteria and conditions:

1. The existing available irrigation stream is of such size that regulation is necessary to accomplish the intended purposes. For small irrigation wells, collection facilities are needed for efficient operation of the pumping plants.
2. Water must be stored to be used between times of rotation deliveries.
3. An adequate and dependable volume of good quality water is or can be made available.
4. Topographic, geologic, and soil conditions are suitable for the practical construction of a regulating reservoir having an adequate storage capacity. Pervious soils in the reservoir area can be sealed so that seepage losses are not excessive.
5. If surface runoff enters the reservoir, the contributing drainage area is or can be protected against erosion so that normal sedimentation does not materially shorten the planned life of the reservoir.

Planning considerations

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.
2. Effects on downstream flows or aquifers that would affect other water uses or users.
3. Potential use for irrigation water management.

Water Quality

1. Effects of erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.
2. Effects on the movement of dissolved substances to ground water.
3. Short-term and construction-related effects on the quality of downstream water courses.
4. Potential of uncovering or redistributing toxic material.
5. Effects on wetlands or water-related wildlife habitats.
6. Effects on the visual quality of water resources.

Design criteria

Capacity. Irrigation regulating reservoirs shall have a usable capacity sufficient to permit the existing irrigation stream to be regulated so that irrigation water can be applied with a reasonably high efficiency. In computing capacity requirements, due consideration shall be given, where applicable, to diverted inflow, surface runoff, precipitation, evaporation, and seepage. Excessive seepage losses shall be prevented by the use of an adapted method of sealing or lining. Additional capacity shall be provided, as necessary, for sediment storage.

Capacity requirements for regulating reservoirs used as part of a system for collecting water from two or more small wells shall be based on the discharge capacities of the contributing wells and on the operation frequency of the sprinkler system.

Reservoir design. Irrigation regulating reservoirs created by earthen dams, enclosed embankments, excavated pits, and the related appurtenant structures shall be designed according to the standard for ponds (378).

Concrete and steel regulating reservoirs shall be designed according to the standard for troughs or tanks (614).

Inlet protection. If the inflow enters the reservoir, the side slope of the reservoir shall be protected against erosion by the use of a pipe inlet or some other suitable structure. The capacity of the inlet structure shall be no less than that required to accommodate the maximum anticipated rate of inflow.

Overflow protection. An overflow protection structure having a capacity equal to or greater than the inlet stream shall be provided for an enclosed embankment. This structure may be designed and installed in combination with the outlet works.

Outlet works. Outlet works shall be provided for the controlled release of irrigation water. The outlet works may consist of a gated conduit through or over the embankment for gravity flow to the irrigated area or to a pumping plant. They may also consist of a pumping plant designed to lift water directly from the reservoir basin.

The capacity of the outlet works shall be no less than that required to provide the outflow rate needed to meet peak period irrigation system demands.

Plans and specifications

Plans and specifications for irrigation regulating reservoirs shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.

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REGULATING RESERVOIR

Design Criteria

Reservoir Design

Irrigation regulating reservoirs created by earthen dams, enclosed embankments, excavated pits, and the related appurtenant structures shall be designed according to the standard for Ponds (378).

Concrete and steel regulating reservoirs shall be designed according to the standards for Troughs or Tanks (614).

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IRRIGATION PIT ENGINEERING NOTEKEEPING

Notekeeping procedures as given in Pond - Excavated Type (378) engineering notekeeping shall be used for this practice.